

CLAIMS:

1. A multiple lumen catheter comprising:
- a) a flexible elongate catheter body extending about a longitudinal axis and having:
 - (i) a distal end with a tapered tip,
 - (ii) a proximal end,
 - (iii) an outer wall, and
 - (iv) a septum extending between spaced points on the interior of said outer wall;
 - b) said outer wall of said catheter body and said septum together defining first and second lumens,
 - c) said outer wall further defining respective first and second apertures providing for fluid communication between said first and second lumens, respectively, and the exterior of said catheter body, said first and second lumens extending from said proximal end of said catheter body to said first and second apertures, respectively; and
 - d) a portion of said septum defining a third lumen, said third lumen having a cross-sectional area substantially smaller than that of either of said first and second lumens, and said third lumen extending centrally along said catheter body from said proximal end thereof to said distal end thereof, and said third lumen being separated from said first and second lumens by said septum.
 - e) said third lumen terminating at the distal terminus of said tapered tip in a third aperture.

2. A catheter as recited in claim 1, wherein said first aperture is located further from said distal terminus of said tapered tip than said second aperture.

3. A catheter as recited in claim 1, wherein said proximal end of said catheter body is provided with a collar carrying wing tabs for attaching the catheter to the skin of a patient after insertion of the catheter, said collar being rotatably mounted on said proximal end of said catheter body.

4. A catheter as recited in claim 3, wherein said collar is retained on said proximal end of said catheter body by first and second retaining portions, each of said retaining portions being formed of a collar bonded to said catheter body.

5. A catheter as recited in claim 1, wherein said catheter body further comprises:

(a) a first solid portion located interior of said outer wall and distal of said first aperture; and

(b) a second solid portion located interior of said outer wall and distal of said second aperture.

6. A catheter as recited in claim 5, wherein said first solid portion extends from said first aperture to said taper tip.

7. A catheter as recited in claim 5, wherein said first solid portion extends distally from said first aperture to a location proximal of said tapered tip.

8. A catheter as recited in claim 1, wherein said outer wall of said catheter body converges radially inwardly at said tip to present a smooth transition from the cross section of said catheter body to a smaller cross section at said distal terminus of said tip.

9. An elongate catheter, said catheter having distal and proximal ends, and said catheter comprising:

- (a) a flexible elongate catheter body extending about a longitudinal axis;
- (b) a tapered tip at said distal end of said catheter,
- (c) said catheter body defining first and second side lumens and a third lumen;
- (d) said first and second side lumens and said third lumen extending from said proximal end of said catheter to first, second, and third apertures, respectively;
 - (i) said first and second side lumens having similar shapes in cross section and terminating at said first and second side apertures, respectively; and
 - (ii) said third lumen extending centrally along said longitudinal axis of said catheter body between said first and second lumens along the length of said catheter body and ending at said third aperture at said distal end of said catheter, said third lumen being smaller in cross-sectional area than either of said first and second side lumens, and said third lumen being proportioned to slidably receive a guide wire during insertion of said catheter into the body of a patient.

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A catheter comprising:

- (a) a smooth elongate flexible cylindrical body having:
 - (i) proximal and distal ends,
 - (ii) an outer wall, and
 - (iii) a septum extending between diametrically spaced points on said outer wall, thereby to define interior of said cylindrical body similar first and second fluid flow lumens, and
- (b) said septum further defining centrally within said septum a circular fluid flow lumen disposed about the longitudinal axis of said cylindrical body and being substantially smaller in cross-sectional area than individual of said first and second fluid flow lumens;
- (c) a tip at said distal end of said cylindrical body, the outer surface of said tip blending smoothly into the outer surface of said cylindrical body, in a direction from said cylindrical body toward the distal terminus of the catheter said outer surface of said tip converging radially inwardly toward said longitudinal axis of said cylindrical body and defining at said distal terminus of the catheter an aperture at the end of said circular fluid flow lumen;
- (d) access means attached to said proximal end of said cylindrical body for providing access thereat to said first and second fluid flow lumens and to said circular fluid flow lumen; and
- (e) one of said cylindrical body and said tip defining the following:
 - (i) a first side aperture adjacent said distal terminus of the catheter communicating through said outer wall with said first fluid flow lumen, and
 - (ii) a second side aperture spaced towards said proximal end

of said cylindrical body from said first aperture and communicating through said outer wall with said second fluid flow lumen.

11. A catheter as recited in claim 10, further comprising rotatable attachment means adjacent said access means for securing the catheter to the skin of a patient.

12. A catheter as recited in claim 10, wherein said first and second fluid flow lumens terminate immediately adjacent the respective distal extremities of said first and second side apertures, respectively.

13. A catheter as recited in claim 10, wherein said tip comprises a separate piece from said cylindrical body, said separate piece having first and second projections engaged from said distal end of said cylindrical body in said first and second fluid flow lumens, respectively, and filling said first and second fluid flow lumens to the extent of said distal extremity of said first and second side apertures, respectfully, when said separate piece is attached to said distal end of said cylindrical body.

14. A triple lumen catheter comprising:

- (a) An elongate catheter body extending about a longitudinal axis from a proximal to a distal end;
- (b) a tapered tip at said distal end of said catheter body;
- (c) said catheter body having an outer wall and an internal septum,

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said septum in combination with said outer wall defining C-shaped first and second lumens longitudinally extending within said catheter body;

(d) said outer wall of said body defining first and second apertures, said first aperture being spaced longitudinally from said tapered tip and from said second aperture, and said second aperture being located between said first aperture and said tapered tip;

(e) said first lumen terminating at said first aperture, and said second lumen terminating at said second aperture;

(f) said septum defining a circular third lumen smaller than said first lumen and smaller than said second lumen, said third lumen terminating at the distal terminus of said tapered tip;

(g) the outer surfaces of said catheter body and said tapered tip combining to present a smooth transition from the cross section of said catheter body to a smaller cross section at said distal terminus of said tapered tip.

15. A catheter as recited in claim 14, further comprising:

(a) a connector attached to said proximal end of said body;

(b) first and second access tubes attached to said connector, said first and second access tubes being coupled by said connector to said first and second lumens, respectively; and

(c) a third access tube smaller than either of said first and second access tubes, said third access tube being attached to said connector and coupled by said connector to said third lumen.

16. A catheter as recited in claim 14, wherein said third lumen is proportioned to slidably receive a guidewire during insertion of the catheter through the skin of a patient.

17. A catheter as recited in Claim 14, wherein said first and second lumens are sized to allow adequate flow rates for haemodialysis therapy, when said first lumen is used to withdraw blood from a vein of a patient for cleansing, and said second lumen is used to return blood to the vein after cleansing.

18. A catheter as recited in Claim 14, wherein the distance from said first aperture to said second aperture is sufficiently large for efficient haemodialysis therapy, when said first lumen is used to withdraw blood from a vein of a patient for cleansing, and said second lumen is used to return blood to the vein after cleansing.

19. A catheter as recited in Claim 14, wherein said third lumen is located at the midpoint of said septum.

20. A catheter comprising:

a cylindrical elongate body extending from a proximal to a distal end, the body defining two similar longitudinally extending lumens separated by a septum and a further lumen defined within the septum;

a tip extending from the distal end of the body defining a part of said further lumen;

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a connector at said proximal end;

tubes coupled to the connector and in fluid communication through the connector one with each of the respective lumens;

the body defining openings providing access one to each of the longitudinally extending lumens, said openings being spaced from one another longitudinally of the body and said further lumen extending longitudinally beyond said longitudinally extending lumens and through the tip;

the further lumen terminating at an opening at the distal end of the tip and the tip being convergently tapered as it extends longitudinally from said body; and

the longitudinally extending lumens being blocked immediately adjacent and distally of said openings.

21. A catheter as claimed in claim 20 in which the catheter's main body is circular in cross-section.

22. A catheter as claimed in claim 20 in which the longitudinally extending lumens are generally C-shaped in cross-section.

23. A catheter as claimed in claim 20 in which the connector is trident-shaped.